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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,276	12/31/2003	Masaru Takaishi	AI 321	6581

7590 03/09/2005

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EXAMINER	
HU, SHOUXIANG	
ART UNIT	**PAPER NUMBER**
2811	

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/748,276	TAKAISHI ET AL.	
	Examiner	Art Unit	
	Shouxiang Hu	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-8 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-8 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 31 December 2003 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 12/31/03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because:

In Fig. 2, the region 8 should be labeled as: N+, instead of N, according to the specification (page 13, line 23).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 6 and 7 are objected to because of the following informalities and/or defects:

In claim 6, the term of "the submount" lacks sufficient antecedent basis in the claim; it apparently should depend on claim 2, instead of claim 1.

In claim 7, the term of "an electrode on the second conductivity type side" fails to clearly define what and where is the second conductivity type side.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Kume (JP 61-107786, 5/26/1986).

Kume discloses a semiconductor device (see Figs. 1-4; also see the English abstract), comprising: a semiconductor chip (1; a diode laser that naturally has polarities); and a plurality of first protection diodes (8) connected in series with polarities thereof being arranged in a same direction as that of the semiconductor chip.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2-7, as being best understood in view of the claim objections, are rejected under 35 U.S.C. 103(a) as being unpatentable over Kume in view of Sone (US 4,847,846) and/or Maloney (US 5,530,612).

The disclosure of Kume is discussed as applied to claims 1 and 8.

Kume further teaches to form a second protection diode (11) in polarities opposite to that of the laser diode (1).

Although Kume does not expressly disclose that the laser diode can be mounted on a submount with the first and/or second diodes being formed in the submount, one of ordinary skill in the art would readily recognize that such an integrated mounting structure can be readily and desirably formed for reducing the size and/or for better heat dissipation, as evidenced in Sone and/or Maloney.

Sone teaches to form a laser diode (LD in Fig. 4A) mounted on the submount having a substrate (1) with an overlying epitaxial layer (2), wherein the third diffusion region (4) and the underling layers (2 and 1) naturally form a second protection diode having polarities opposite to that of the laser diode (LD); and wherein the submout naturally dissipate heat generated in the laser diode.

And, Maloney teaches to form first protection diodes (see Figs. 3 and 11) having a semiconductor substrate (P-type; the lower portion of "P-SUB" or 50; Si); and device forming layer (P-type; the upper portion of "P-SUB" or 50), wherein each of the plurality of first protection diodes includes: a first diffusing layer (N-WELL); a second diffusing layer (P+). It is noted that the term of "epitaxial" is here regarded as a process limitation, which would not carry patentable weight in this claim drawing to a structure, because distinct structure is not necessarily produced. In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the submount of Sone and/or the diode string of Maloney into the semiconductor device of Kume, so that an integrated device structure with reduced size and/or better heat dissipation would be obtained.

Regarding claim 7, as being best understood in view of the claim objections above, it is noted that Kume teaches to have a direct connection between the lower potential sides of the laser diode (1) and the first protection diodes in series (the diode string 8); and it is further noted that it is commonly desirable in the art to connect the substrate having protection elements formed therein to the lower potential side of the device through a surface connection region, for improving the stability of the device. Such connection is readily evidenced in the prior art such as Jimenez (US 5,646,433; see the fourth diffusion layer 32 in Fig. 3). Accordingly, it would be well within the ordinary skill in the art to make such connections in the above collectively taught device for achieving better stability for the device.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References C-F are cited as being related to a diode protection structure and/or a heat sink structure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SH
March 4, 2005

SHOUXIANG HU
PRIMARY EXAMINER